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Practice F1170-88(1993) Standard Practice for Determining the Performance of a Filter Medium Using Water and Siliceous Particles

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1. Scope

1.1 Practice F795 provides a practice for conducting a single-pass, constant-flow-rate, liquid filtration test, and Practice F796 provides a practice for a constant-pressure test, but both practices leave it to the investigator to employ the liquid and particles which are of interest; depending on the planned use of the medium. This practice, in an effort to approach a standard method, actually specifies a test liquid and test particles. This practice does not supercede those earlier practices. Indeed, this practice specifies that those earlier procedures be followed. Those procedures determine filtration efficiency from measurements of turbidity, the mass concentration of particles, and (where an automatic particle counter is used), the concentrations of different size particles, in the streams to and from the filter medium. Further, those procedures determine the capacity of the medium to collect test particles before plugging. Capacity refers to the mass of particles fed to a unit area of the medium.

1.2 Potable water is selected as the present test liquid simply because of its availability and of its ease of use and disposal. It is of course recognized, and so stated in the two cited practices, that a given filter medium will perform differently for different fluids. That is, where the performances of two or more different filter media are compared via the present procedure, such a comparison, or ranking, may be seen differently with a different fluid.

1.3 The specification of siliceous particles here means a test dust of the kind offered by AC Spark Plug and by Powder Technology, Inc. These materials have also been referred to as Arizona Road Dust. Since the compositions are essentially quartz, the present procedure specifies "siliceous" particles. These types of test particles are chosen because they are in common use, and because both the fine and the coarse grades contain a broad range of particle sizes. Both grades are rich in small particles, for example, 0.5 [mu]m diameter, and, at the same time, the diameters of the largest particles reach 80 to 200 [mu]m. Which is to say that the investigator who chooses to employ a particle counter to analyze the feed and filtrate streams will be able to learn the efficiency with which the filter medium under study separates many different size particles from the feed stream.

1.4 This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

D1889 Test Methods for Turbidity of Water
D2276 Test Methods for Particulate Contaminant in Aviation Turbine Fuels
F660 Practice for Comparing Particle Size in the Use of Alternative Types of Particle Counters
F795 Practice for Determining the Performance of a Filter Medium Employing a Single-Pass, Constant-Rate, Liquid Test
F796 Practice for Determining the Performance of a Filter Medium Employing a Single-Pass, Constant-Pressure, Liquid Test
B93.31 Method for Evaluating the Filtration Performance of a Fine Hydraulic Fluid Power Filter Element (National Fluid Power Association Standard T 3.10.08-1973)
F 313 Test Method for Insoluble Contamination of Hydraulic Fluids by Gravimetric Analysis
F 902 Practice for Calculating the Average Circular Capillary Equivalent Pore Diameter in Filter Media from Measurements of Porosity and Permeability
National Secondary Drinking Water Regulations (EPA
Standard Methods For the Examination of Water and ed., 1981.

Index Terms

Constant flow test; Filters/filter procedures; Flow and flow rate-filters; Pore size characteristics; Potable water; Siliceous test dust; Viscous permeability; Water; performance of filter medium using water and siliceous particles,; practice,; Performance-filters; filter medium using water and siliceous particles, practice